The invention claimed is

[0001] A nanocomposite produced by the process comprising:

dissolving a metal ionsalt in a solvent system to form a metal ion salt solution, wherein said solvent system is common to said metal ion salt and a polymer;

adding an epoxide to said metal ion salt solution to form an epoxide-containing metal ion salt solution;

dissolving said polymer in said solvent system to form a polymer solution;

adding a portion of the polymer solution to the polymer-containing metal ion salt solution to form a polymer-containing, epoxide-containing metal ion salt solution; and

stirring said a polymer-containing, epoxide-containing metal ion salt solution until said solution gels.

[0002] The nanocomposite produced by the process recited in Claim 10, further comprising:

adding a fuel metal powder to said polymer-containing, epoxide-containing metal ion salt solution while stirring, wherein said addition of the fuel metal powder occurs before said polymer-containing, epoxide-containing metal ion salt solution gels.

[0003] The nanocomposite recited in Claim 10, wherein said metal oxide is Fe_2O_3.

[0004] The nanocomposite produced by the process recited in Claim 10, wherein said polymer is a fluoroelastomer.

[0005] The nanocomposite produced by the process recited in Claim 11, wherein said fluoroelastomer is Viton®A, A-100.

[0006] The nanocomposite produced by the process recited in Claim 10, wherein Viton®A, A-100 is soluble in said solvent system.

[0007] The nanocomposite produced by the process recited in Claim 10, wherein said solvent system is a mixture of ethanol and acetone.

[0008] The nanocomposite produced by the process recited in Claim 11, wherein said fuel metal powder is Al, Mg, B, Ti, Zr or mixtures thereof.

[0009] The nanocomposite produced by the process recited in Claim 11, wherein said fuel metal powder is ultra fine grain aluminum.

[00010] A nanocomposite comprising:

an inorganic sol-gel polymer phase comprising at least one metal-oxide and at least one epoxide; and

an interpenetrating organic polymer phase entwined in said inorganic sol-gel phase.

[00011] The nanocomposite recited in Claim 19, wherein said inorganic sol-gel polymer phase further comprises:

A fuel metal powder.

[00012] The nanocomposite recited in Claim 19, wherein said metal oxide is Fe_2O_3.

[00013] The nanocomposite recited in Claim 19, wherein said polymer is a fluoroelastomer.

[00014] The nanocomposite recited in Claim 22, wherein said fluoroelastomer is Viton®A, A-100 .

[00015] The nanocomposite recited in Claim 20, wherein said fuel metal powder is Al, Mg, B, Ti, Zr or mixtures thereof.

[00016] The nanocomposite recited in Claim 20, wherein said fuel metal powder is ultra fine grain aluminum.